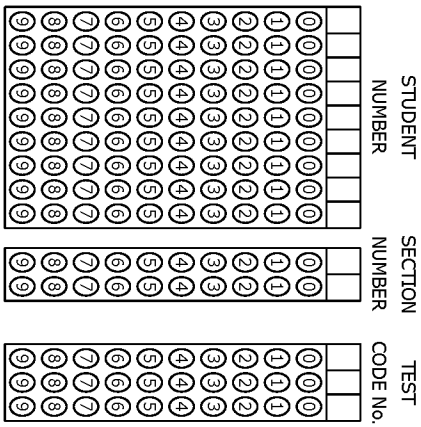
KFUPM	Phys102-242	Quiz-0225
Physics Department	Sec:04-05-06	25-Feb-2025

NAME _____

STUDENT No. _____

SECTION No. _____



---

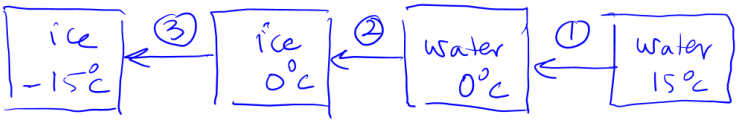
1 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 26 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 51 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 76 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 101 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

2 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 27 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 52 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 77 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 102 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

3 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 28 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 53 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 78 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 103 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Q1. 80.3 g of water at 61.3 °C are converted slowly into ice at -53.7 °C. What is the change of entropy of water in the units of J/K? specific heat of water is 4190 J/kg·K, specific heat of ice is 2220 J/kg·K, water heat of fusion is 333 kJ/kg, water heat of vaporization is 2256kJ/kg

A) -9.25
B) -205
C) -160
D) -7.68
E) -92.3



$$\Delta S = \Delta S_1 + \Delta S_2 + \Delta S_3$$

$$= m c_w \ln\frac{T_{f1}}{T_{i1}} - \frac{mL}{T_2} + m c_i \ln\frac{T_{f3}}{T_{i3}}$$

$$= 0.0803\left(4190 \ln\frac{0+273}{15+273} - \frac{333\times10^3}{0+273} + 2220 \ln\frac{-15+273}{0+273}\right)$$

$$\simeq -205 \text{ J/K}$$

Q2. A Carnot heat engine absorbs 127 kJ as heat and expels 53.2 kJ as heat in each cycle. If the low-temperature reservoir is at 107 °C, find the temperature of the high-temperature reservoir.

A) 908 °C
B) 634 °C
C) 255 °C
D) 780 °C
E) 495 °C

$$\frac{|Q_H|}{|Q_L|} = \frac{T_H}{T_L} \Rightarrow$$

$$T_H = T_L \frac{|Q_H|}{|Q_L|} = (107+273)\frac{127}{53.2} - 273 = 634\,^\circ\text{C}$$

23 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 48 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 73 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 98 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 123 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

24 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 49 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 74 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 99 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 124 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

25 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 50 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 75 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 100 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 125 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ